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ABSTRACT

IEP (Information Exchange Procedures), developed by the National Center for Higher Education Management Systems, is a set of standard definitions and procedures for collecting institutional information related to: costs of disciplines and degree programs, outcomes of instructional programs, and general institutional characteristics. This prospectus describes IEP by answering the following questions: (1) What is IEP? (2) How was IEP developed? (3) What are the components of IEP? (4) How have institutions used IEP information? (5) How does NCHEMS support the implementation process, and what costs are incurred by an institution? (6) How does an institution become involved in the IEP implementation project? (7) What source materials are available for IEP? (HJM)

A PROSPECTUS ON THE NCHEMS INFORMATION EXCHANGE PROCEDURES IMPLEMENTATION PROJECT

1974-1975

Prepared by
Charles W. Manning
Robert A. Huff

September, 1974

YOUR INSTITUTION IS INVITED TO PARTICIPATE

Most of the work at the National Center for Higher Education Management Systems (NCHEMS) during the past three years has been devoted to developing standard definitions and procedures that institutions of postsecondary education may use to produce compatible information for voluntary exchange and comparison. After two years of pilot testing, this Information Exchange Procedures (IEP) Project is nearing completion, making the end product available for widespread application in the postsecondary education community. Your institution is invited to participate in a national IEP Implementation Project that NCHEMS will sponsor in 1974-75. This prospectus briefly explains what IEP is, and how your institution can help to implement it.

The prospectus addresses these questions:

WHAT IS IEP?

HOW WAS IEP DEVELOPED?

WHAT ARE THE COMPONENTS OF IEP?

HOW HAVE INSTITUTIONS USED IEP INFORMATION?

HOW DOES NCHEMS SUPPORT THE IMPLEMENTATION PROCESS AND WHAT COSTS ARE INCURRED BY AN INSTITUTION?

HOW DOES AN INSTITUTION BECOME INVOLVED IN THE IEP IMPLEMENTATION PROJECT?

WHAT SOURCE MATERIALS ARE AVAILABLE FOR IEP?

A set of standard definitions and procedures for collecting institutional information related to:

- **COSTS OF DISCIPLINES AND DEGREE PROGRAMS**
- **OUTCOMES OF INSTRUCTIONAL PROGRAMS**
- **GENERAL INSTITUTIONAL CHARACTERISTICS**

An institution may use the IEP definitions and procedures in compiling information about its costs, its outcomes, and its descriptive characteristics. Each institution decides what information it wishes to exchange—all, or any portion of the IEP package. Procedures for compiling information are fixed in order to maintain exchange compatibility.

HOW WAS IEP DEVELOPED?

- INITIALLY DEVELOPED BY A TASK FORCE
- REFINED AFTER A PREPILOT TEST
- FURTHER REFINED AFTER A PILOT TEST

The Information Exchange Procedures initially were developed by the NCHEMS staff with guidance from a task force and steering committee composed of institutional and state agency representatives.

The procedures related to isolating the component costs of an institution's operation were tested in 1972-73 in about twenty community colleges, twenty private colleges, and twenty state colleges and universities. The results of this test were used to refine the costing procedures.

The full set of exchange procedures was tested in 1973-74 in about the same number of institutions. Insights gained from this test served to refine the full range of IEP procedures.

WHAT ARE THE COMPONENTS OF IEP?

THE INFORMATION EXCHANGE PROCEDURES HAVE THREE COMPONENTS:

A *cost study* that uses data from an institution's accounting system, student registration system, and personnel system to determine the costs of disciplines (departments) and degree programs (student majors).

An *outcome study* to identify and collect outcome measures appropriate to an institution. The outcome data are collected through a survey of students, graduates, and employers of graduates.

A listing of *descriptive information* about an institution's students, faculty, facilities, and organization that defines more comprehensively the institution's characteristics.

INFORMATION COLLECTED FROM THE *COST STUDY* INCLUDES:

Direct and Full Cost per Credit Hour
—by instruction level within discipline
—by student level within student program
Costs of Other Primary Activities
Costs of Support Activities

INFORMATION COLLECTED FROM THE *OUTCOME STUDY* INCLUDES:

Number of Graduates in Each Student Program
Number of Graduates Seeking and Accepted for Further Study
Number of Graduates Seeking and Obtaining Employment
Satisfaction of Graduates in Achieving Educational Goals

INSTITUTIONAL DESCRIPTORS COLLECTED FOR IEP INCLUDE:

Information About Students—
SAT and ACT Scores
Financial Aid Information
Sex and Civil Rights Categories
Enrollment by Student Program

Information About Faculty—
Number and Salary by Rank and Discipline
Highest Degree Earned
Sex and Civil Rights Categories

Information About the Institution—
Legal Control
Highest Degree Offered
Predominant Calendar System
Goals and Mission Statement

THE COST STUDY

The cost study comprises these components:

1. Define the Activity Structure
2. Cross Over Institutional Expenditures to the Activity Structure
3. Develop an Instructional Work Load Matrix
4. Calculate Direct Unit Costs for Disciplines
5. Calculate Direct Unit Costs for Student Programs
6. Calculate Full Unit Costs for Disciplines and Student Programs

STEP 1—DEFINE THE ACTIVITY STRUCTURE

To develop compatible cost information, institutional data must be organized in a common structure, such as the NCHEMS Program Classification Structure (PCS) used by IEP. This structure has a broad scope to accommodate the variety of activities undertaken by postsecondary institutions. Each institution identifies those activity centers in the IEP Activity Structure (on the opposite page) that are appropriate for classifying its activities.

IEP ACTIVITY CENTER STRUCTURE (NCHEMS PCS)

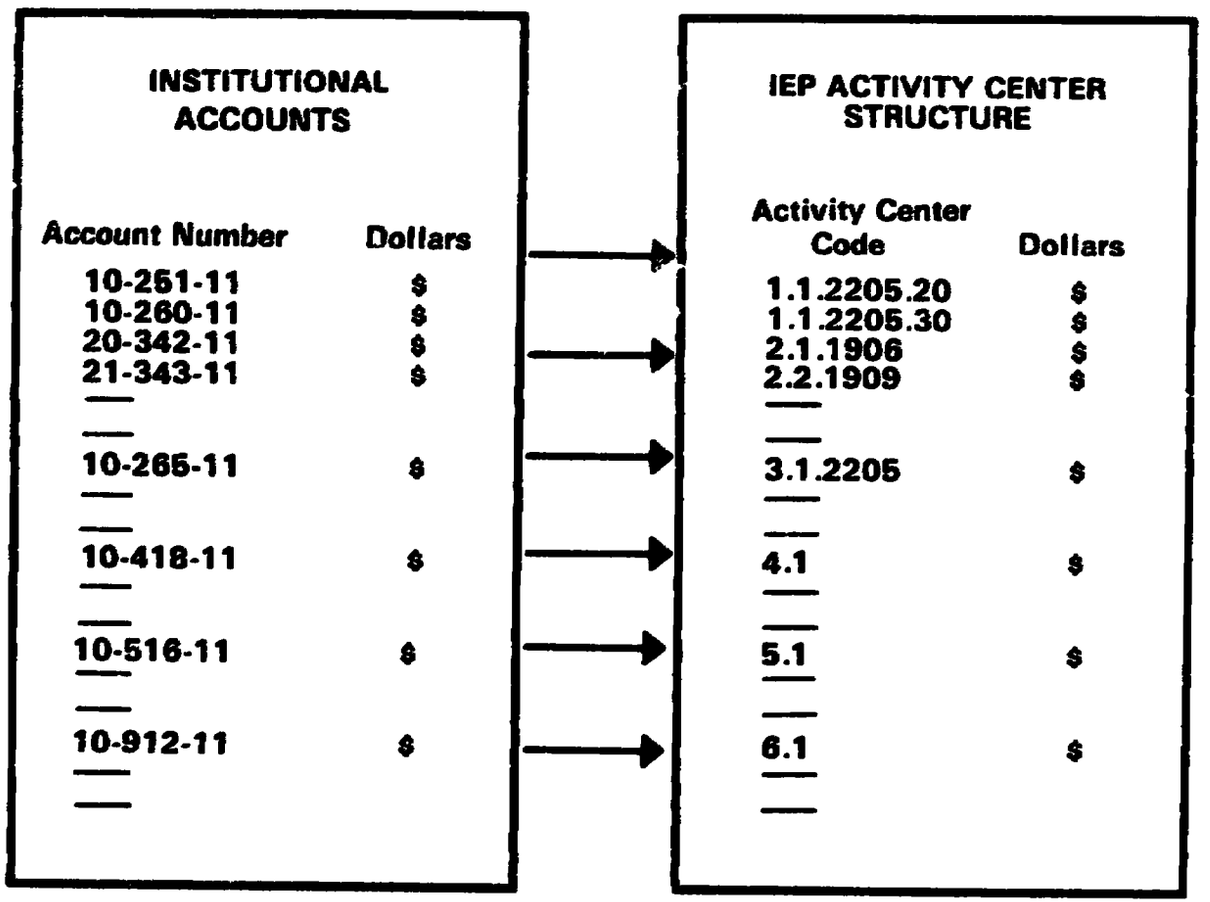
CODE	TITLE
1.1.xxxx.xx	General Academic Instruction (delineated t discipline and course level)
1.2.xxxx.xx	Occupational & Vocational Instruction (delineated to discipline and course level)
1.3.xxxx.xx	Special Session Instruction (delineated to discipline and course level)
1.4.xxxx.xx	Extension Instruction—For Credit (delineated to discipline and course level)
1.5.xxxx	Adult Basic Education (delineated to discipline level)
2.1.xxxx	Institutes and Research Centers (delineated to discipline level)
2.2.xxxx	Individual or Project Research (delineated to discipline level)
3.1.xxxx	Community Education (delineated to discipline level)
3.2	Community Service
3.3	Cooperative Extension Service
3.4	Patient Service
3.5	Specialized Training Programs
4.1	Libraries
4.2	Museums and Galleries
4.3	Audio/Visual Services
4.4	Computing Support
4.5.xx	Ancillary Support (above discipline level)

CODE	TITLE
4.6.xx	Academic Administration and Personnel Development (above discipline level)
4.7.xx	Course and Curriculum Development (above discipline level)
5.1.7100	Student Development
5.1.7200	Intercollegiate Athletics
5.2	Supplementary Educational Service for Students
5.3	Counseling and Career Guidance for Students
5.4	Student Financial Aid Administration
5.5	Student Support
5.6	Student Admissions and Records
6.1	Executive Management
6.2	Fiscal Operations
6.3	General Administrative Services
6.4	Logistical Services
6.5	Physical Plant Operations and Maintenance
6.6	Faculty and Staff Services
6.7	Community Relations
6.8	Capital Cost—Buildings and Land Improvements
6.9	Capital Cost—Equipment
7.0	Independent Operations
8.1	Scholarships
8.2	Fellowships
9.0	Hospitals

STEP 2—Cross Over Institutional Expenditures to the Activity Structure

The expenditures shown in the institution's accounting system are transferred to the IEP activity structure. Institutional information about the use of resources is used to identify activity centers to which dollars should be transferred. For example, faculty work load patterns are used to determine how faculty compensation should be transferred to the IEP activity structure. NCHEMS has developed computer software to simplify this process.

TRANSFER EXPENDITURES FROM INSTITUTIONAL ACCOUNTS TO THE IEP STRUCTURE



STEP 3—DEVELOP AN INSTRUCTIONAL WORK LOAD MATRIX

An Instructional Work Load Matrix is a table that displays the relationship between the credit hours offered by departments and the credit hours taken by students in different majors. In the example to the right, lower-level math majors take a total of 800 lower-division credit hours from the math discipline. Likewise, lower-level political science majors take 100 lower-division credit hours from the math discipline. Each institution must develop an Instructional Work Load Matrix that displays the relationship between its student programs and its instructional disciplines. NCHEMS has developed software that simplifies construction of this matrix.

INSTRUCTIONAL WORK LOAD MATRIX

	Math Major Lower Level	Math Major Upper Level	Political Science Major Lower Level	Political Science Major Upper Level	Totals
Math Discipline Lower Division	800	50	100	50	1000
Math Discipline Upper Division	90	900	0	10	1000
Poli. Sci. Disc. Lower Division	200	10	90	1700	2000
Poli. Sci. Disc. Upper Division	50	0	50	400	500
Total Credits Taken From All Other Disciplines	1000	1500	2500	300	5300
Totals	2140	2460	2740	2460	9800

STEP 4—Calculate Direct Unit Costs for Disciplines

In STEP 2, direct expenditures for each discipline are isolated. In STEP 3, credit hours taught by each discipline are determined. STEP 4 involves calculating the average cost per credit hour for each instruction level. In the example to the right, lower-division math courses cost $20,000 per year and 1000 lower-division credit hours were generated. The unit cost (cost per credit hour) is $20,000 ÷ 1000, or $20. NCHEMS has developed computer software that aids in determining instructional unit costs.

CALCULATION OF DIRECT UNIT COSTS FOR DISCIPLINES

Direct Expenditures in Each Activity Center	
Math Lower Division	$20,000
Math Upper Division	30,000
Poli. Sci. Lower Division	20,000
Poli. Sci. Upper Division	10,000

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Total Credits Attempted	
Math Lower Division	1000
Math Upper Division	1000
Poli. Sci. Lower Division	2000
Poli. Sci. Upper Division	500

=

Direct Unit Costs	
Math Lower Division	$20
Math Upper Division	30
Poli. Sci. Lower Division	10
Poli. Sci. Upper Division	20

STEP 5—CALCULATE DIRECT UNIT COST FOR STUDENT PROGRAM

The cost per credit hour for each student program is calculated from the data derived in the previous steps. This calculation involves (1) multiplying the credit hours taken by students in each program from each discipline by the average cost per credit hour in that discipline, (2) summing this product to get the total program costs, and (3) dividing the total program costs by the total credit hours taken by all students in each major. For example, the direct cost of teaching a lower level math major is calculated by summing (800 X 20), (90 X 30), (200 X 10), (50 X 20), and (1,000 X 40)—equalling $61,700. The total number of credits taken by a lower-level math major is 2,140 as determined in the Instructional Work Load Matrix. The average cost per program credit then may be calculated by dividing $61,700 by 2,140—equalling $29.

CALCULATION OF THE COST PER CREDIT FOR EACH STUDENT PROGRAM

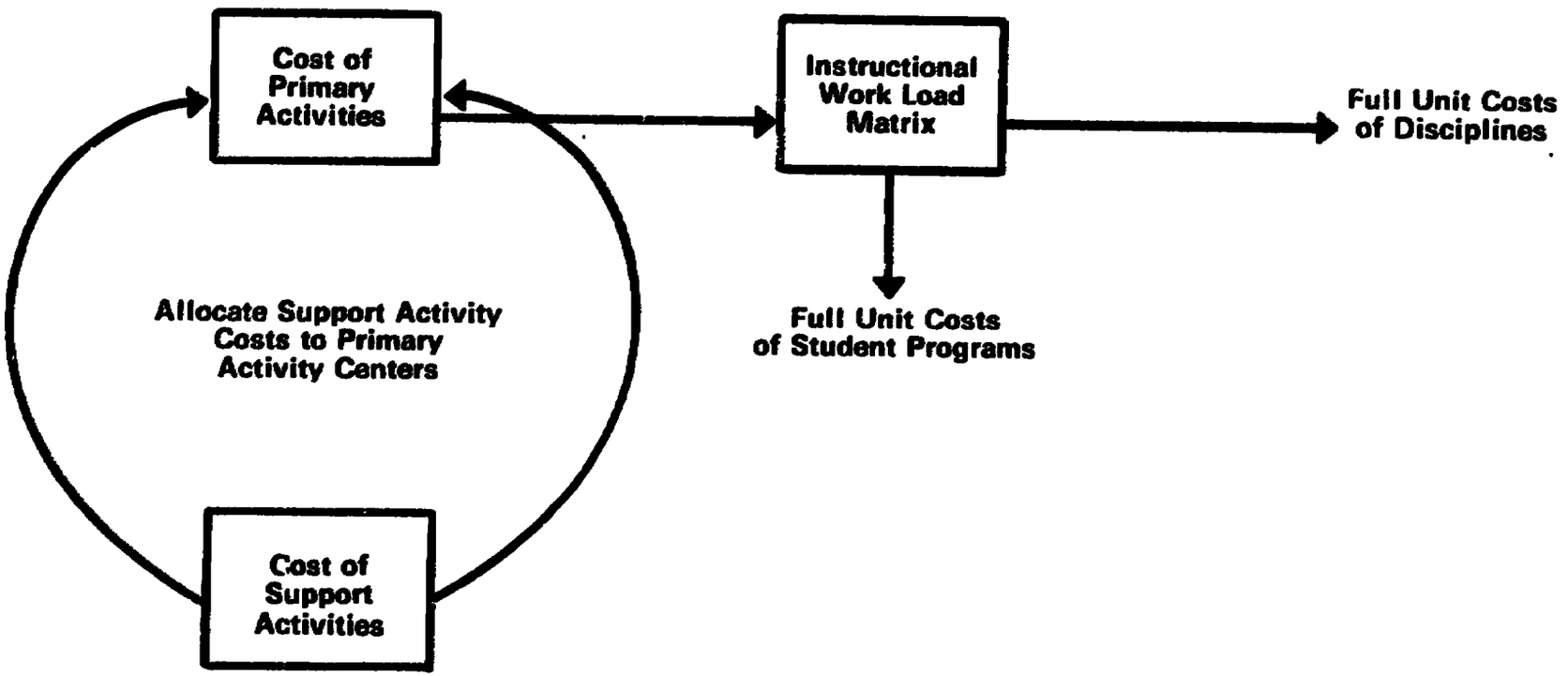
ORGANIZATIONAL UNIT	STUDENT PROGRAM: Math Major Lower Level	Math Major Upper Level	Political Science Major Lower Level	Political Science Major Upper Level
Math Discipline Lower Division	800 X $20	50 X $20	100 X $20	50 X $20
Math Discipline Upper Division	90 X $30	900 X $30	0 X $30	10 X $30
Poli. Sci. Disc. Lower Division	200 X $10	10 X $10	1700 X $10	90 X $10
Poli. Sci. Disc. Upper Division	50 X $20	0 X $20	50 X $20	400 X $20
Average of all Other Disciplines Contributing to Math and Poli. Sci. Programs	1000 X $40	1500 X $40	2500 X $20	300 X $40

Total Program Costs	Total Credit Hours Taken by All Students in Each Major	Average Cost per Program Credit
$22,200	2460	$9
$70,000	2740	$26
$38,100	2460	$36
$61,700	2140	$29

STEP 6—CALCULATE FULL UNIT COSTS FOR DEPARTMENTS AND STUDENT PROGRAMS

To calculate the full costs, the procedures in Steps 1 through 5 are repeated, except that the support costs first are allocated to the primary activities. For example, before full unit costs may be calculated, the cost of running the president's office and other costs related to the executive management of the institution must be allocated to the primary activities of the institution. Thus some of the costs of the president's office, of the grounds maintenance department, of the computer center, and of each of the other support areas are allocated to the primary activities of the institution. Once all support costs are allocated to primary areas, the full unit costs of disciplines and student programs may be calculated as outlined in Steps 3 through 5.

CALCULATION OF FULL UNIT COSTS



THE OUTCOME STUDY

Studying the outcomes of an institution is an involved and never-ending task. It is unlikely that there ever will be a large standard set of outcome measures. The selection of outcome measures is a function of the unique goals and missions of each institution and therefore only the more general measures could ever be considered as standard. For this reason, NCHEMS has identified a variety of outcome measures from which an institution may select those most relevant to its goals.

NCHEMS provides a collection procedure for each measure selected. For example, an institution might choose to collect certain measures from its graduating students or alumni. NCHEMS has developed survey instruments for both these groups. In using NCHEMS survey instruments, an institution selects those questions it believes to be appropriate and then follows NCHEMS procedures in conducting the surveys.

KINDS OF INFORMATION THAT MIGHT BE COLLECTED FROM THE SURVEYS

SURVEY OF GRADUATING STUDENTS

Number of Graduates Seeking Additional Education

Number of Graduates Seeking and Obtaining Employment

Starting Salary of Those Graduates Finding Employment

Satisfaction of Graduates With Their Educational Experience

SURVEY OF ALUMNI

Highest Degree Earned

Field of Employment

Salary Level

Type of Position

Satisfaction of Alumni With Their Educational Experience

COMPILATION OF INSTITUTIONAL CHARACTERISTICS

When one institution studies the costs and outcomes of another, it must be able to put the costs and outcomes in the proper context. The institutional characteristics help to describe the style and flavor of the reporting institution. The information collected relates to faculty, students, facilities, and general institutional attributes.

DESCRIPTIVE INFORMATION ABOUT THE INSTITUTION

STUDENTS

Distribution of SAT/ACT Scores
Amount of Financial Aid
Student Tuition and Fees
Student Civil Rights Categories
Number of Students Enrolled by Program
Geographic Origin of Students
Student Age and Sex

FACULTY

Distribution of Faculty Ranks
Number of Faculty on Tenure
Highest Degree Earned
Average Compensation by Rank
Faculty Sex
Faculty Civil Rights Categories

FACILITIES

Assignable Square Feet by Activity
Center and Room Use Categories

GENERAL CHARACTERISTICS

Public Private
Multiple Single Campus
Calendar System
Length of Academic Year
Highest Degree Offered
Faculty Union Information
Source of Funding
Statement of Institutional Goals

HOW HAVE INSTITUTIONS USED IEP INFORMATION?

Institutions involved in the pilot test of IEP have used IEP information and accompanying cost simulation capability in a variety of ways. The most common application has been in the area of resource acquisition and allocation. Some institutions have used the IEP data in justifying budgets to funding sources, while others have used the data in defining department staffing patterns.

IEP data have been used also in curriculum development and modification. When new programs are proposed or when the curricula of existing programs are to be changed, information collected through IEP studies may be used to evaluate the cost implications of the proposed change.

Where faculty are represented by a bargaining unit, institutions have used the Resource Requirements Prediction Model (RRPM) simulation system associated with the IEP study to evaluate rapidly the cost implications of proposed salary or faculty work load changes. The timely determination of the cost implications of these and other proposals by a bargaining unit was found to be a constructive element in the bargaining process.

A frequent result of using IEP data has been alteration of the decision-making process and a shift in the level of decision-making responsibility. At IEP pilot test institutions, several decisions about the internal allocation of resources were made at the department level instead of the central administrative level, where they probably would have been made in the absence of the new IEP data.

The table to the right shows some of the ways that twelve pilot test institutions used information derived from the Information Exchange Procedures.

INSTITUTIONAL USES OF IEP INFORMATION

	State U. of NY—Plattsburg	St. Joseph's College (Indiana)	Community College of Philadelphia	Mansfield State College (Pennsylvania)	Rider College (New Jersey)	Georgia Institute of Technology	New Mexico Junior College	University of North Dakota	U. of Wisconsin—LaCrosse	County College of Morris (New Jersey)	University of Northern Colorado	University of New Mexico
Resource Acquisition				X		X	X		X	X	X	X
Resource Allocation	X		X	X	X		X	X		X	X	X
Curriculum Development and Modification	X	X	X	X								
Union Contract Negotiation			X									
Alteration of Decision-Making Process	X		X									

For complete source information used in preparing this table, see *Profiles of Management Information Uses*, Robert Huff and Michael Young, Boulder, Colorado, Western Interstate Commission for Higher Education, May, 1974.

HOW DOES NCHEMS SUPPORT THE IMPLEMENTATION PROCESS AND WHAT COSTS ARE INCURRED BY AN INSTITUTION?

The level of effort required to implement IEP depends on the state of the institution's operational data systems. The implementation of IEP is not difficult if the institution has good data on students and the courses they take and on faculty and the courses they teach, and has an accounting system that indicates expenditures by department for faculty salaries, staff salaries, and other operational expenditures.

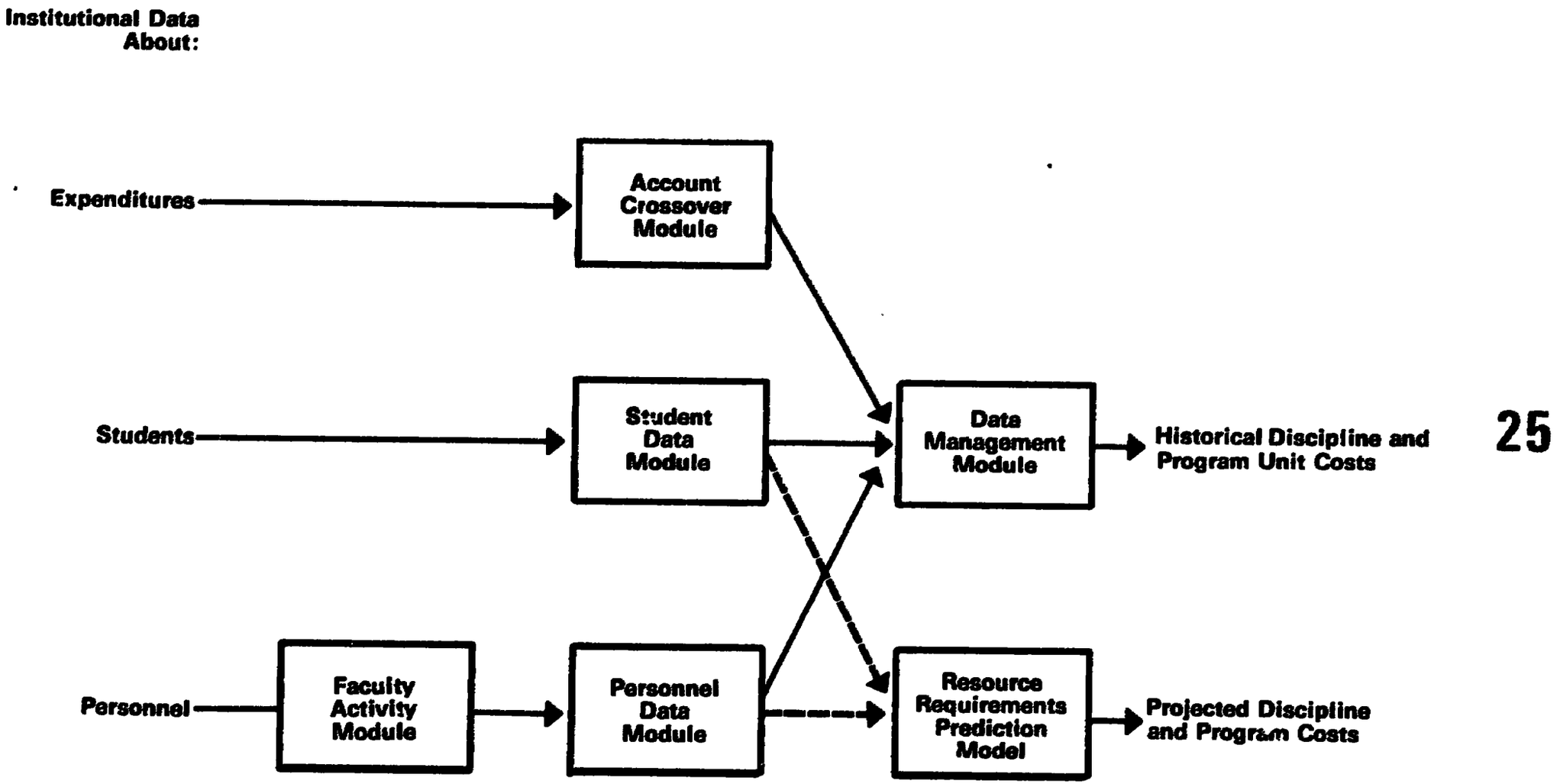
NCHEMS supports implementation by providing computer software to aid institutions in working with their data and by providing direction in organizing and outlining the tasks involved.

SOFTWARE SUPPORT

NCHEMS has developed a computer software system that uses data from an institution's files to generate IEP cost study information. The system is called *NCHEMS Costing and Data Management System*, and costs $50 per module. Many smaller institutions will not need or wish to use all available modules.

The software system contains the modules shown to the right. Data from an institution's financial, student, and personnel records are passed to the appropriate modules of this system. The modules use the institutional data to calculate the historical discipline and student program costs and, in addition, to prepare the input data needed by the Resource Requirements Prediction Model. This model may be used to help an institution predict future costs and to explore the cost implications of alternative plans.

NCHEMS COSTING AND DATA MANAGEMENT SYSTEM



IMPLEMENTATION ASSISTANCE

INITIAL TRAINING SESSION

NCHEMS assists participating institutions or groups of institutions by describing and outlining the tasks required for the implementation of IEP.

PROBLEM-SOLVING SESSIONS

During the implementation process, NCHEMS will provide assistance whenever needed to assure that the procedures are implemented in as smooth and consistent a manner as possible.

FACILITATE INFORMATION EXCHANGE

NCHEMS also will assist institutions in exchanging the information collected. A task force representative of IEP implementers will advise NCHEMS on the development of appropriate mechanisms for voluntary exchange.

COST TO THE INSTITUTION

Estimating the cost of this kind of effort is always difficult, but necessary. The best information NCHEMS can provide is the cost stated by the participating institutions of implementing the costing study of IEP during the prepilot test. The display below gives the median and average costs of implementation at the three types of institutions participating in the study. The imputed costs displayed in the table include the costs of personnel time diverted to this project from other institutional activities.

COSTS INCURRED BY INSTITUTIONS DURING IMPLEMENTATION OF INFORMATION EXCHANGE PROCEDURES

TYPE OF INSTITUTION	MEDIAN/AVERAGE CASH EXPENDITURES	MEDIAN/AVERAGE IMPUTED COST	MEDIAN/AVERAGE TOTAL COST
COMMUNITY COLLEGES AND TWO-YEAR TECHNICAL SCHOOLS	$235/$745	$3,500/$6,460	$5,000/$7,210
STATE COLLEGES AND UNIVERSITIES	$200/$190	$3,500/$4,490	$3,800/$4,480
PRIVATE COLLEGES AND UNIVERSITIES	$370/$1,640	$2,800/$3,890	$3,500/$5,550

For complete source information used in preparing this table, see *Exploring Cost Exchange at Colleges and Universities*, William Collard and Robert Huff, Boulder, Colorado, Western Interstate Commission for Higher Education, February, 1974.

HOW DOES AN INSTITUTION BECOME INVOLVED IN THE IEP IMPLEMENTATION PROJECT?

NCHEMS invites institutions of postsecondary education to participate in the IEP Implementation project. The following steps should be followed by any interested institution:

1. Fill out the brief form on the following page, indicating interest in learning more about IEP Implementation.
2. Attend a briefing session to learn more about what is involved in IEP. These sessions will be conducted in various parts of the country by NCHEMS staff. After NCHEMS receives the form from an institution, the institution will be notified of IEP briefing sessions in its locale.
3. Decide whether the institution wishes to make a commitment to participate during 1974-75 and exchange resulting data. Only after attendance at an IEP briefing will institutions be asked to decide the extent (if any) to which they wish to become involved in the project.

How Many Institutions Will Participate and Exchange Data?

A national survey conducted in the summer of 1974 asked educators with a statewide perspective to estimate the extent of institutional participation in the IEP project. The results of that survey lead to the expectation that some 500 institutions will begin IEP Implementation in 1974-75 under this NCHEMS project.

NCHEMS IEP IMPLEMENTATION PROJECT
INSTITUTIONAL RESPONSE FORM

Mail To: NCHEMS-IEP
NCHEMS at WICHE
P.O. Drawer P
Boulder, Colorado 80302

Our institution wishes to learn more about the 1974-75 IEP Implementation Project. Please send us information about IEP briefing sessions scheduled in our area. It is understood that submitting this form in no way obligates our institution to participate in the IEP Implementation Project.

Institution: _____

Address: _____

_____

_____

Phone: _____

Check One: ☐ Public ☐ Private

Check One:
- ☐ Community College
- ☐ State College or Teaching University
- ☐ Private Liberal Arts College
- ☐ Comprehensive University
- ☐ Complex Research University
- ☐ Other

Institutional Representative to be Contacted by NCHEMS:

Name: _____

Title: _____

Phone: _____

There are many NCHEMS documents about Information Exchange Procedures. Those most pertinent for implementation purposes are:

Information Exchange Procedures (Field Review Edition). Nancy Renkiewicz and James Topping. Boulder, Colorado. Western Interstate Commission for Higher Education. 1973.

NCHEMS Information Exchange Procedures Cost Study Implementation Guide. Richard Johnson. Boulder, Colorado. Western Interstate Commission for Higher Education. 1974.

NCHEMS Costing and Data Management System Documentation:

Student Data Module—
- Introduction
- System Documentation

Faculty Activity Module—
- Introduction
- System Documentation

Personnel Data Module
- Introduction
- System Documentation

Account Crossover Module—
- Introduction
- System Documentation

Data Management Module—
- Introduction
- System Documentation